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(54) Multi-directional radial wheel trolley and track for operable walls.

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Description

The present invention relates to a track and trolley system for movably supporting wall panels according to the first part of claim 1.

The present invention generally relates to a multidirectional radial wheel track and trolley system for operable walls in which the trolley includes radial support wheels rotatable in the same direction about horizontal axes and supported from a plate, frame or the like in which the radial wheels are arranged in laterally spaced tandem pairs. The trolley is provided with guide rollers adjacent each end thereof which depend from the plate and are positioned in the track slot and mounted for rotation about generally vertical axes to guide the trolley with the guide rollers and curvature of the track slot being dimensioned to prevent contact between the edge of the track slot and a depending supporting bolt for the wall panel when the trolley moves through a track intersection having a curved element. By imparting a manual lateral force to a moving wall panel, the trolleys and thus the wall panel may be selectively moved through the track intersection in multiple directions without stopping at the intersection. Optional diverter pins may be provided on the trolley for association with optional diverter blades at certain track intersections so that at such intersections the trolleys and thus the wall panels will move in a preprogrammed path.

Many trolley and track systems have been utilized to movably support operable wall panels or partitions. One such arrangement is disclosed in Pat. No. 4,141,106; issued February 27, 1979, which includes various arrangements in which a canted wheel or canted wheels are provided on the trolley which enables the trolleys and panels to move in multi-directions through an intersection by exerting lateral pressure on the panel and trolleys to cause the trolleys and panel to move in a selected direction at an intersection in the track. Pat. No. 3,879,799, issued April 29, 1975, discloses a multi-directional support for movable partitions in which the carrier or trolley includes rollers which rotate about a vertical axis.

U.S. Pat. No. 1,889,112 issued November 19, 1932 discloses an early development in this type of trolley and track system in which four radial wheels are provided on the trolley for multi-directional movement through a track intersection in which the rotational axes of the wheels are in perpendicular relation to each other. In this construction, all four wheels will drop into the track slots at the intersection thus causing the supported panel to drop vertically and become stuck. Such a structure does not work satisfactorily with operable walls having panels that may weigh anywhere from 226,5 to 908 kg (500 to 2000 lbs). U.S. Pat. No. 3,708,916 discloses a similar structure in which the problem of the panel dropping when the wheels register with the track slot at an intersection has been recognized and arcuate plates have been added to the trolley to reduce the distance that the wheels drop into the track slot when they pass through an intersection. Even with the plates, the wheels still will drop partially into the track slots and the panels still become stuck. Also, as illustrated in Fig. 10 of that patent, the trolleys cannot rotate in relation to the panel thereby orienting the axes of rotation of the radial wheels in angular relation to the track flanges during movement of the trolleys through the broken line position causing frictional drag and requiring greater force necessary to move the panels.

Another type of trolley and track system utilizes spherical balls to support the trolley for movement along a track. U.S. Pat. Nos. 3,181,274 and 3,253,552 disclose such arrangements. However, the supporting balls and their close fitting sockets quickly become clogged with dirt which prevents rotation of the balls. This results in the balls wearing or grinding out grooves in the track flanges especially when used with an aluminum track with the trolleys being difficult to move along the track and not capable of movably supporting heavy panels without great physical effort. In addition, U.S. Pat. Nos. 3,462,792 issued August 26, 1969 and 4,159,556 issued July 3, 1979 disclose additional trolley arrangements supported from track flanges by spherical balls with Pat. No. 4,159,556 disclosing the use of upwardly facing spherical bearings located adjacent the junction or intersection in the track to engage and support the trolley as the trolley is moved across the junction in an effort to prevent the balls from dropping into the track slot at track intersections.

Another type of trolley and track system is disclosed in U.S. Pat. No. 3,557,499 which utilizes a circular disc or puck mounted on the upper end of a pendant bolt with the axial lower surface of the disc or puck sliding along the upper surface of the track flanges.

German Pat. No. 2,145,793 discloses several embodiments of a trolley with radial wheels having rotational axes in perpendicular relation to each other. In the arrangement illustrated in Figs. 1 and 2, four balls are supported from the trolley to support the trolley when the radial wheels cross an intersection which arrangement still permits the trolley to drop a short vertical distance when the wheels drop into the track slot which then causes the periphery of the balls to support the trolley from the track flanges. Each trolley requires eight supporting bearings which is a costly structure. In Figs. 3 and 4, four pads are provided in lieu of balls to function to limit the vertical drop of the radial wheels when crossing an intersection. In both

arrangements, the trolley can unintentionally rotate at the track intersection causing the rotational axes to be angled in relation to the track slot rather than perpendicular or parallel to the track slot thereby causing dragging friction. In Figs. 5 and 6, an auxiliary arrangement of radial wheels is provided supported by a laterally extending arm connected with the pendant bolt. In Figs. 7 and 8, pins 25 are used to keep the trolley from unintentionally rotating at the track intersection but in this construction when the two trolleys of a panel simultaneously traverse two intersections, the pins and guide slots do not operate satisfactorily causing the trolleys to become stuck and the embodiment of this type of structure which is being manufactured now utilizes a ball-type arrangement somewhat similar to that disclosed in U.S. Pat. No. 4,159,556. German Pat. No. 2,159,539 discloses a four wheel trolley having the axes in perpendicular relation together with a puck arrangement positioned above the trolley and engaging auxiliary flanges to limit the vertical downward movement of the trolley when the wheels cross a track slot.

The prior art discloses many different types of multi-directional trolley and track systems for supporting wall panels and the like which enable an operator to select the direction of movement through an intersection in the track. The prior art includes slide discs, canted rotatable wheels, wheels rotatable about vertical axes, spherical ball arrangements and radial wheel arrangements, all of which have some of the disadvantages and shortcomings as discussed above. Further, all the prior art multi-directional trolleys require that the trolley come to a dead stop at the intersection prior to a change in direction of trolley movement, thereby causing a loss of momentum in the panels' travel as well as inconvenience, loss of time and extra effort by the operator.

Also, there are track and trolley systems commercialized that include dynamic, i.e., switchable track intersections, commonly referred to as track switches, usually electrically operated, that are used with radial wheel trolleys for high load capabilities and which allow the operator to select the direction of travel of the trolley through the switch. In some designs the entire switch assembly rolls back and forth along a system of carriages with the switch being moved by pistons. Such switches are of complex and expensive construction, require wiring the switch to a building power source and control wiring to a remote control switch. The control switches are usually locked key controls and operated only by qualified building maintenance personnel. The key control is often located a long distance from the track switch especially where multiple track switches are in a room thereby requiring coordination between a person moving the panels and another person operating the key control or lengthy setup time to travel between the key control and the panels particularly when some trolleys are required to move in one direction and other trolleys in another direction through the track switch. A complex track system, for example to divide a large assembly room into many smaller meeting rooms using operable wall panels, may require a track layout incorporating numerous track intersections with different panels moving through each intersection in different directions. In such an arrangement the cost, complexity and operational inconvenience of track switches can be considerable.

Also, commercialized is a preprogrammed track system incorporating diverter intersections and diverter trolleys in which each panel will be directed along a single predetermined path to form a wall or partition with this type of system requiring less operator skill since interacting guide arrangements are provided on the trolleys and tracks at the intersections to make certain that each trolley will move in a predetermined direction through each intersection. This system has all of the high load bearing and free rolling advantages of radial wheels but lacks the ability for a trolley to be selectively directed at certain intersections.

Also known are track systems incorporating a combination of track diverters and track switches whereby respective trolleys move through the track diverters in a preprogrammed manner but can be selectively directed at the track switches upon electro-mechanically switching each switch, with the attendant costs and inconvenience of track switches as enumerated above.

From DE-A 36 14 627 a track and trolley system for movably supporting wall panels according to the first part of the main claim is known.

Nowhere in the prior art or commercial practice are there known trolley and track systems for operable walls incorporating static (i.e., non-switchable) track intersections at which it is possible for a trolley upon entering the intersection from at least one direction to be selectively caused to exit the intersection in any of two or more directions without the inconvenience of stopping to align the trolley with the intersecting track and to change the direction of the trolley's travel.

Therefore, the object of the invention is it to provide a track and trolley system in accordance with the first part of the main claim which enables a trolley entering an interesection from at least one direction to exit to that intersection in any of at least two directions without stopping while changing the direction of travel.

This object is solved by a track and trolley system according to the first part of the main claim which also includes the features of the characterizing part of the main claim.

According to the present invention a multidirectional trolley and track for operable walls is provided in which the trolley utilizes four radial wheels all of which are oriented in the same direction resulting in high load carrying capacity, ease of operation, better tracking along the track flanges and no dropping of the wheels as they cross a track intersection in as much as three of the four wheels will always carry the load at an intersection thereby providing a steady level support which does not teeter-totter as it crosses a track intersection. The positions and diameter of the guide rollers in relation to the position and diameter of the support bolt and the radius of curvature of the curved track flange edge cooperate to enable the operator to selectively effect a change of direction in trolley and panel movement without stopping the motion of the trolley and panel. As a trolley arrives at the track intersection, it is only necessary to impart lateral force sufficient to hold the lead guide roller against the curved track flange edge until the lead guide roller has entered the track slot of the connecting track. This initiating lateral manual force rotates the trolley approximately 30° and thereafter the guide rollers and track slot automatically rotate the trolley the remainder of the turn. In the case of a 90° turn, the approximately 30° initial manual rotation accounts for approximately 1/3 of the turn while the automatic rotation accounts for approximately 60° or 2/3 of the turn. This enables the operator to exert lateral force to the trolley as it approaches an intersection and eliminates the necessity of slowing and stopping the trolley to align it with an intersecting branch track slot which is necessary when the track slots are connected by a 90° sharp angled corner. This greatly reduces the time and effort required to effectively move the trolleys and supported panels.

Another object of the invention is to provide a track and trolley system in accordance with the preceding object in which the four radial wheel trolleys which have forward and rear guide rollers mounted centrally thereon to engage the track slot will be engaged with the track slot edge when side pressure is exerted on the panel and trolley to facilitate use of the trolleys in a multi-directional track system even though the trolley may have diverter pins mounted thereon with the pins being ineffective when the intersection is not provided with diverter blades.

Yet another feature of the invention is to provide a track and trolley system in accordance with the preceding objects including a T-type intersection having a curved track element engaged by guide rollers on the trolley body.

Still another significant feature of the invention is to provide a track and trolley system in accordance with the preceding objects including a 4-way or X-type intersection or a 3-way or Y-type intersection having a double 45° curve in one direction and a 90° curve in the opposite direction and located at different points along the track with the oppositely extending track sections in parallel and aligned relation to each other to preclude the trolley wheels from dropping at an intersection inasmuch as three of the wheels will be continuously engaged with the track flanges.

Still another object of the present invention is to provide a combined multi-directional track and trolley system in which the trolley is provided with four radial wheels rotatable about horizontal axes and the track is provided with intersections incorporating curved elements with the trolley including longitudinally spaced guide rollers received in the track slot and dimensioned and spaced in relation to a centrally disposed depending support bolt to maintain the support bolt positioned in spaced relation to the slot edges.

A still further object of the invention is to provide a track and trolley system as set forth in the preceding objects in which certain of the intersections are optionally provided with diverter blades and the trolleys are provided optionally with diverter pins having selected locations and lengths cooperating with the diverter blades to preprogram the movement of the panels through the intersection thereby enabling both multi-directional intersections and preprogrammed intersections thereby combining multi-directional movement of the panels and preprogrammed directional movement of the panels in the same track system to enhance the versatility of installation and use.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic perspective view illustrating a trolley and track system of the present invention with a curved track intersection and stacking area being illustrated.

Figure 2 is a schematic perspective view illustrating a 4-way or X-type intersection.

Figure 3 is a perspective view of the trolley employed in this invention.

Figure 4 is a schematic plan view of the trolley and track illustrating the curved track slot edges and the relationship of the radial wheels, guide rollers and supporting bolt for the panel.

Figure 5a is a schematic plan view illustrating a side force on a panel and the relationship of the components of the trolley and track of this invention.

Figure 5b is a schematic plan view illustrating a comparative trolley in which the guide rollers and supporting bolt are of equal diameter.

Figure 6 is a schematic plan view illustrating the manual turn angle and automatic turn angle of the trolley during a turn cycle.

Figure 7 is a schematic plan view of a Y-type intersection with the trolley being turned to the left.

Figure 8 is a schematic plan view illustrating a 4-way or X-type intersection with a 90° curve in one direction and two 45° curves in the opposite direction.

Figure 9 is a bottom schematic view of a track intersection with diverter blades associated therewith.

Figure 10 is a sectional view illustrating the relationship of the trolley, diverter pins and diverter blades.

Figure 11 is a sectional view similar to Fig. 10 with the addition of lower diverter pins and blades.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now specifically to the drawings, the track and trolley system of the present invention as illustrated in Fig. 1 is generally designated by reference numeral 10 in which the track includes a T-intersection 12 and a stacking area 13 incorporating another T-intersection as well as a simple curve. Fig. 2 illustrates the track and trolley system of the invention designated by reference numeral 14 in which a 4-way or X-intersection 16 is disclosed. Various types of intersections normally provided in a track system may be employed with the invention to enable suspended wall modules or panels 18 to be moved along the track system with trolleys 20 supporting the panels.

As illustrated in Fig. 3, each trolley 20 includes a generally rectangular plate, frame or other rigid body 22 journalling four radial wheels 24 with the wheels being rotatable about horizontal axles or pins 26 with two of the wheels oriented at each side of the rigid rectangular plate 22 with the periphery of the radial wheels 24 supportingly engaging the horizontal track flanges 28 forming a portion of the downwardly facing, inverted channel-shaped track 30 with the wheels 24 being spaced to engage the flanges 28 adjacent the edges of the track slot 32. Centrally of the rigid trolley plate 22 is a depending pendant bolt 34 which supports the panel 18 in a well-known and conventional manner.

Located adjacent the front and rear of the trolley plate 22 and depending from the center line thereof is a pair of guide rollers 36 which rotate about vertical axles or pins 38 with the guide rollers 36 having an outside diameter substantially the same but slightly less than the width of the track slot 32 as illustrated in Fig. 4. Also as illustrated in Fig. 4, the guide rollers 36 engage the curved edge 40 of the T-intersection 12 when lateral force is exerted on the panel to cause the trolley 20 to move from the straight track segment 42 onto the branch track segment 44. The diameter of and distance between the rollers 36, the radius of the curved edge 40 of the intersection and the diameter of the supporting pendant bolt 34 are related in a manner to prevent the pendant bolt 34 from coming into contact with the curved edge 40 of the track intersection. Therefore, side force results in the lead and trail guide rollers of the trolley following the track edge it is forced against as illustrated in Fig. 5a thereby causing the trolley to change its direction of travel and to rotate a corresponding amount so that the trolley wheels 24 always rollingly engage the track flanges.

Figs. 5a and 5b illustrate this relationship and the results of a side force being exerted on a panel. The dimensional characteristics of these components are approximated by the formula:

$$\eta \geq \frac{(D_1 - D_2)^2 + \ell^2}{4(D_1 - D_2)}$$

with

η = Radius of track curvature
D_1 = Diameter of guide rollers
D_2 = Diameter of pendant bolt
ℓ = Distance between centers of guide rollers

As illustrated in Fig. 5a, when a side force is applied to the panel, the guide rollers follow the curved edge

40 during the turn cycle. However, if the rollers and pendant bolt were the same diameter, as shown in Fig. 5b, the pendant bolt would engage the track flanges and cause the lead guide roller to tend to move in a generally straight line toward the opposite point of the intersection and prevent the trolley from rolling through the directional change.

Fig. 6 schematically illustrates the application of lateral manual force being applied to the panel to rotate and change direction of the trolley for approximately 30° of a turn after which the trolley automatically rotates and changes direction for the remainder of the turn.

Fig. 7 illustrates a 3-way or Y-type intersection which includes a single 90° curved section 50 connecting perpendicularly arranged track sections 52 and 54 which enables the trolley 20 to move to the left from track section 52 onto track section 54. Alternately, the trolley 20 can move from track section 52 to track section 56 through a 45° angular track section 58 joined to the track section 52 by a 45° curved section 60 and joined to the track section 56 by a 45° curved section 62.

Fig. 8 illustrates a 4-way or X-type intersection which is generally the same as Fig. 7 except that a straight through track section 64 is in alignment with and forms a continuation of track section 52 so that a trolley can move straight through from track section 52 to track section 64 which is in alignment therewith or it can move from track section 52 onto track section 54 or onto track section 56. This arrangement combines a 90° curve with two 45° curves thereby spacing the points where the respective curves 50 and 60 intersect the track slot 32 of track segment 52, so that only one of the four trolley wheels 24 crosses the track slot 32 at any one time thus enabling the three remaining trolley wheels to support the trolley as the single wheel crosses the slot thereby enabling the trolley to cross the track slot smoothly without dropping. This feature enables a four-wheel trolley to be utilized rather than a six wheel trolley or some other more complex structure to keep the wheels from dropping into the track slot 32 as the trolley traverses the crossover. Six-wheel trolleys are very difficult to force through a multidirectional intersection because of the additional axle spacing. By enabling the use of a four-wheel trolley, the axle spacing can be reduced with the closer axle spacing requiring less force to cause the trolley to follow the curves of the track. The two 45° curves 60 and 62 and the 90° curve 50 in Fig. 8 allows opposite direction track section center lines to cross each other from a single point at the center of the intersection with the opposite track sections 54 and 56 not only being parallel but also in alignment to provide a compact intersection.

Thus, the combination of the rigid carrier plate, frame or other generally rectangular trolley body 22 with the four radial wheels mounted in closely spaced relation to each other on the trolley plate 22 together with longitudinally spaced apart curves 50 and 60 eliminates the problem of existing structures in which the trolley or carriage wheels or rollers drop into a track slot.

When combining the multi-directional track and trolley system with the preprogrammed track and trolley system, the trolley plate 22 will be provided with upstanding diverter pins 46 at opposite ends thereof with the diverter pins being oriented at selected positions on the trolley plate 22 to engage depending diverter blades 48 associated with one or more diverter intersections as shown in Figs. 9-11. Further, as shown in Fig. 10, depending upon the position and length of the pins 46 on the trolley and the positioning and vertical height of the diverter blade or blades 48, the trolley 20 will follow a predetermined route along the overhead track system thereby eliminating the possibility of a panel 18 being moved to an erroneous position. The diverter pins 46 can be long or short to cooperate with tall or short blades and can be oriented at different positions on the trolley. The variation in length of the pins 46 and height of the blades 48 is illustrated by dotted line in Fig. 10. Fig. 11 illustrates an arrangement in which the trolley has a depending pin support 47 having upwardly and/or downwardly projecting pins 46 thereon to cooperate with depending and/or upstanding blades 48 supported from depending supports 49 on the track. The pins 46 are preferably provided with rotatable sleeves journaled thereon to reduce frictional drag when the pins engage the diverter blades 48. Various combinations of movement may be employed to preprogram the movement of the panels with a lead trolley on a panel and the rear trolley on a panel not necessarily following the same path, for example, with the lead trolley going straight and the rear trolley going left as occurs in the stacking area in Fig. 1.

Combining the beneficial features of a multi-directional trolley track system and the preprogrammed trolley track system enables the movable wall panels, for example, to be easily stored in a preprogrammed area and enables the same panels to assume wall forming position in two or more different areas without the use of track switching stations.

Depending on the diverter blade position on successive diverter intersections and the position of the diverter pins on the trolley, the trolley will always follow the same route along an overhead track system except when manually directed at a multi-directional track intersection. The depending guide rollers on the bottom front and back of a four radial wheel trolley enable side pressure exerted by the diverter pins in a preprogrammed system to cause the trolley guide rollers to follow the track slot edge that it is being

pushed against regardless of whether the track slot is straight or curved in either direction. This allows a track intersection without diverter blades to be multi-directional even though the trolley has diverter pins mounted thereon. Thus, there has been combined the easily maneuvered preprogrammed track trolley system and a multi-directional trolley track system using the advantages of both systems.

Claims

1. A track and trolley system (10) for movably supporting wall panels (13) said track (30) including spaced track flanges (28) defining a track slot (32), said trolley (20) including four radial wheels (24) mounted in laterally spaced tandem pairs on a rigid trolley body (22) for rotation about parallel horizontal axes, said wheels (24) rollingly engaging said track flanges (28), a supporting member (34) extending through said track slot (32) and connecting said trolley (20) with a panel (13), said track (30) including at least one track intersection (12, 16), and said trolley (20) includes a pair of longitudinally spaced guide rollers (36) rotatable about vertical axis, said supporting member (34) being disposed between said guide rollers (36),
characterized in that
said track intersection (12, 16) includes at least two intersecting straight portions (42, 44) interconnected by a connecting track portion, said connecting track portion including at least one curved track flange edge (40), the distance between and the outer diameter of said guide rollers (36) and the radius of said curved track flange edge (40) being dimensioned to maintain said supporting member (34) in spaced relation to said curved track flange edge (40) thereby enabling the lead guide roller to follow said curved track flange edge (40) due to lateral force exerted on said trolly (20) during initial movement into said track connecting portion with the remaining movement of said trolley through said intersection being automatically guided as said guide rollers (36) follow the track slot (32) in said track connecting portion.

2. The structure as defined in claim 1 characterized in that the rotation of said trolley is comprised of an initial manual partial rotation, caused by application of lateral manual force to said panel, followed by automatic rotation caused by cooperation between said trolley (20) and said connecting track portion.

3. The structure as defined in claim 1 or 2 characterized in that said manual partial rotation is on the order of 30°.

4. The structure as defined in claim 3 characterized in that at said track intersection said trolley (20) rotates and changes its direction of travel by a total of 90° of which said automatic rotation is on the order of 60°.

5. The structure as defined in claim 1-4 characterized in that the radius of said curved track flange edge (40) is approximated by the following formula:

$$r \geq \frac{(D_1 - D_2)^2 + \ell^2}{4(D_1 - D_2)}$$

wherein r is the radius of said curved track flange edge (40), D_1 is the diameter of each of said guide rollers (36), D_2 is the diameter of said supporting member (34) and ℓ is the distance between the axes of said guide rollers.

6. The structure as defined in claim 1 characterized in that said trolley (20) upon entering said intersection (16) from at least one direction can exit said intersection in any of three directions without stopping while changing its direction of travel.

7. The structure as defined in claim 1 characterized in that said track intersection (16) is an X-intersection comprised of a straight through track (52, 64) together with right hand (56) and left hand (54) branch

tracks that are aligned with each other and perpendicular to said through track (52, 64) each branch track being connected to said through track by a connecting track portion such that the respective connecting track portions intersect said through track on opposite sides and at points longitudinally spaced along said through track (52, 64) thereby avoiding transverse alignment of openings in the track flanges of said through track (52, 64) and precluding vertical movement of said trolley (20) as it traverses said intersection in a straight through direction or in either branch direction with three of the four wheels (24) on said trolley (20) always being in supporting engagement with said track flanges (28).

8. The structure as defined in claim 7 characterized in that one of said connecting track portions includes a 90° curved track element (50) and the other of said connecting track portions includes a pair of spaced 45° curved track elements (60, 62) to facilitate alignment of said branch tracks (54, 56) with each other and the longitudinal spacing of the points of intersection of said respective connecting track portions with said through track (52, 64).

9. The structure as defined in claim 1 characterized in that said track intersection is a Y-intersection comprised of a straight approach track (52) together with right hand (56) and left hand (54) branch tracks that are aligned with each other and perpendicular to said approach track (52), each branch track being connected to said approach track by a connecting track portion such that the respective connecting track portions join said approach track (52) at points longitudinally spaced along said approach track, one of said connecting track portions including a 90° curved track element (5) and the other of said connecting track portions including a pair of spaced 45° track elements (60, 62) to facilitate alignment of said branch tracks (54, 56) with each other.

10. The structure as defined in claim 9 characterized in that said trolley (20) does not require the application of lateral manual force to said panel in order to rotate and change its direction of travel at said 90° curved track element (50) but does require the application of lateral manual force to said panel in order to rotate and change its direction of travel at the first of said 45° curved track elements (60).

11. The structure as defined in claim 1 characterized in that in addition to said track intersection (12, 16) the track includes at least one diverter intersection in which said trolley upon entering said diverter intersection from any direction can exit said diverter intersection in only one direction without reversing its direction of travel.

12. The structure as defined in claim 11 characterized in that said diverter intersection includes a track diverter element mounted rigidly thereon and said trolley (20) includes trolley diverter means engaging said track diverter element for controlling directional movement of said trolley (20) through said diverter intersection.

13. The structure as defined in claim 12 characterized in that said track diverter element is a straight line element when said trolley (20) is controlled to move straight through said diverter intersection.

14. The structure as defined in claim 12 characterized in that said track diverter element is a curved line element when said trolley (20) is controlled to change its direction of travel at said diverter intersection.

15. The structure as defined in claim 12 characterized in that said track diverter element is in the form of a longitudinally extending straight or curved vertical blade (48).

16. The structure as defined in claim 12 characterized in that said trolley diverter means is in the form of a pair of longitudinally spaced vertically extending pins (46) or rollers.

17. The structure as defined in claim 12 characterized in that said trolley diverter means may be located along, or laterally spaced on either side of the longitudinal centerline of said trolley (20) for engaging correspondingly positioned track diverter elements.

18. The structure as defined in claim 17 characterized in that said trolley diverter means may be located above or below said trolley body (22) for engaging correspondingly positioned track diverter elements.

19. The structure as defined in claim 18 characterized in that said trolley diverter means when located below said trolley body (22) may extend upwards or downwards.

20. The structure as defined in claim 18 characterized in that said trolley diverter means may be tall or short and said track diverter elements may be tall or short such that tall trolley diverter means will engage tall or short track diverter elements while short trolley diverter means will engage tall, but not engage short, track diverter elements.

21. The structure as defined in claim 12 characterized in that said track and trolley system (10) has supported therefrom a plurality of panels (18), each panel being supported from said track by two trolleys (20), said system including one or more of said track intersections (12, 16) and one or more of said diverter intersections each of the trolleys (20) in said system including said trolley diverter means so that each trolley (20) upon entering a track intersection (12, 16) can be selctively caused to exit such track intersection in either of at least two directions without stopping and upon entering a diverter intersection can exit such diverter intersection in only one direction without reversing its direction of travel, thereby providing a track and trolley system having a combination of one or multi-directional track intersections offering directional selectivity with one or more diverter intersections offering proprogrammed directional control.

22. The structure as defined in claim 1 characterized in that said track and trolley system (10) has supported therefrom a plurality of panels (18) each panel being supported from said track by two trolleys (20), said track intersection being in the form of a dual purpose track/diverter intersection incorporating a track diverter element mounted rigidly thereon, some of the trolleys in said system including trolley diverter means that engage said track diverter element for preprogrammed directional control of such trolleys through said intersection while other trolleys in said system either do not include trolley diverter means or include trolley diverter means configured to not engage said track diverter element so that such trolleys can be selectively directed in multidirections through said intersection.

Patentansprüche

1. Gleis- und Laufkatzensystem (10) zur beweglichen Unterstützung von Wandplatten (13), wobei das genannte Gleis (30) in Abständen angebrachte Gleisflansche (28) zur Begrenzung eines Gleisschlitzes (32) enthält und die genannte Laufkatze (20) vier radiale Räder (24) aufweist, die als seitlich in Abständen angebrachte Tandempaare auf einem starren Laufkatzenkörper (22) zur Drehung um parallel verlaufende horizontale Achsen angeordnet sind, während die genannten Räder (24) rollend in die genannten Gleisflansche (28) eingreifen, wobei sich ein Stützelement (34) durch den genannten Gleisschlitz (32) erstreckt und die genannte Laufkatze (20) mit einer Platte (13) verbindet, während das genannte Gleis (30) wenigstens eine Gleiskreuzung (12, 16) enthält und die genannte Laufkatze (20) ein Paar in Längsrichtung in Abständen angeordnete Führungsrollen (36) enthält, die um eine vertikale Achse drehbar sind, und wobei das genannte Stützelement (34) zwischen den genannten Führungsrollen (36) angeordnet ist,
dadurch gekennzeichnet, daß
die genannte Gleiskreuzung (12, 16) wenigstens zwei einander schneidende gerade Abschnitte (42, 44) enthält, die durch einen verbindenden Gleisabschnitt miteinander verbunden sind, wobei der genannte verbindende Gleisteil wenigstens eine gekrümmte Gleisflanschkante (40) enthält und der Abstand zwischen den genannten Führungsrollen (36) sowie der Außendurchmesser derselben und der Radius der genannten gekrümmten Gleisflanschkante (40) so bemessen sind, daß das genannte Stützelement (34) in einem Abstand von der genannten gekrümmten Gleisflanschkante (40) gehalten wird und dadurch die vordere Führungsrolle der genannten gekrümmten Gleisflanschkante (40) infolge der seitlichen Kraft folgen kann, die während der anfänglichen Bewegung in den genannten gleisverbindenden Abschnitt auf die genannte Laufkatze (20) ausgeübt wird, während die restliche Bewegung der genannten Laufkatze durch die genannte Kreuzung automatisch gelenkt wird, während die genannten Führungsrollen (36) dem Gleisschlitz (32) im genannten gleisverbindenden Abschnitt folgen.

2. Zusammenbau gemäß der Definition in Anspruch 1, dadurch gekennzeichnet, daß die Drehung der genannten Laufkatze aus einer anfänglichen manuellen Teildrehung besteht, die durch Ausübung einer seitlichen manuellen Kraft auf die genannte Platte bewirkt wird, gefolgt von einer automatischen

Drehung, die durch das Zusammenwirken zwischen der genannten Laufkatze (20) und dem genannten verbindenden Gleisabschnitt bewirkt wird.

3. Zusammenbau gemäß der Definition in Anspruch 1 oder 2, dadurch gekennzeichnet, daß die genannte manuelle Teildrehung in der Größenordnung von 30° liegt.

4. Zusammenbau gemäß der Definition in Anspruch 3, dadurch gekennzeichnet, daß die genannte Laufkatze (20 an der genannten Gleiskreuzung rotiert und ihre Laufrichtung um insgesamt 90° verändert, wovon die genannte automatische Drehung in der Größenordnung von 60° liegt.

5. Zusammenbau gemäß der Definition in Anspruch 1-4, dadurch gekennzeichnet, daß der Radius der genannten gekrümmten Gleisflanschkante (40) etwa folgender Formel entspricht:

$$r \geq \frac{(D_1 - D_2)^2 - l^2}{4(D_1 - D_2)}$$

worin r den Radius der genannten gekrümmten Gleisflanschkante (40), D_1 den Durchmesser jeder der genannten Führungsrollen (36), D_2 den Durchmesser des genannten Stützelemente (34) und l den Abstand zwischen den Achsen der genannten Führungsrollen bezeichnen.

6. Zusammenbau gemäß der Definition in Anspruch 1, dadurch gekennzeichnet, daß die genannte Laufkatze (20) nach dem Einfahren in die genannte Kreuzung (16) aus wenigstens einer Richtung die genannte Kreuzung in einer von drei beliebigen Richtungen verlassen kann, ohne während des Fahrtrichtungswechsels anzuhalten.

7. Zusammenbau gemäß der Definition in Anspruch 1, dadurch gekennzeichnet, daß die genannte Gleiskreuzung (16) eine X-Kreuzung ist, bestehend aus einem geraden Durchgangsgleis (52, 64) zusammen mit rechten (56) und linken (54) Zweiggleisen, die zueinander und lotrecht zum genannten Durchgangsgleis (52, 64) ausgerichtet sind, wobei jedes Zweiggleis mit dem genannten Durchgangsgleis durch einen verbindenden Gleisabschnitt in der Weise verbunden ist, daß die betreffenden verbindenden Gleisabschnitte das genannte Durchgangsgleis auf gegenüberliegenden Seiten und an Punkten, die in Längsrichtung in Abständen an dem genannten Durchgangsgleis (52, 64) angeordnet sind, kreuzen und dadurch eine Querausrichtung von Öffnungen in den Gleisflanschen des genannten Durchgangsgleises (52, 64) verhindern und eine vertikale Bewegung der genannten Laufkatze (20) unmöglich machen, während diese die genannte Kreuzung in gerade durchgehender Richtung oder in einer der Abzweigrichtungen durchfährt, wobei drei der vier Räder (24) an der genannten Laufkatze (20) stets mit den genannten Gleisflanschen (28) in stützendem Eingriff stehen.

8. Zusammenbau gemäß der Definition in Anspruch 7, dadurch gekennzeichnet, daß einer der genannten verbindenden Gleisabschnitte ein um 90° gekrümmtes Gleiselement (50) und der andere der genannten verbindenden Gleisabschnitte ein Paar in einem Abstand angeordneter, um 45° gekrümmter Gleiselemente (60, 62) enthält, um die Ausrichtung der genannten Zweiggleise (54, 56) zueinander zu erleichtern und die Schnittstellen der genannten jeweiligen verbindenden Gleisabschnitte mit dem genannten Durchgangsgleis (52, 64) in einem Längsabstand zu halten.

9. Zusammenbau gemäß der Definition in Anspruch 1, dadurch gekennzeichnet, daß die genannte Gleiskreuzung eine Y-Kreuzung ist, bestehend aus einem geraden Zufahrtgleis (52) zusammen mit rechten (56) und linken (54) Zweiggleisen, die zueinander und lotrecht zum genannten Zufahrtgleis (52) ausgerichtet sind, wobei jedes Zweiggleis mit dem genannten Zufahrtgleis durch einen verbindenden Gleisabschnitt in der Weise verbunden sind, daß die jeweiligen verbindenden Gleisabschnitte an Punkten auf das genannte Zufahrtgleis (52) stoßen, die in Längsrichtung entlang des genannten Zufahrtgleises in Abständen angeordnet sind, während einer der genannten verbindenden Gleisabschnitte ein um 90° gekrümmtes Gleiselement (5) und der andere der genannten verbindenden Gleisabschnitte ein Paar in einem Abstand angebrachter 45°-Gleiselemente (60, 62) enthält, um die

Ausrichtung der genannten Zweiggleise (54, 56) im Verhältnis zueinander zu erleichtern.

10. Zusammenbau gemäß der Definition in Anspruch 9, dadurch gekennzeichnet, daß die genannte Laufkatze (20) nicht die Ausübung einer seitlichen manuellen Kraft auf die genannte Platte erfordert, um die Rotation und eine Fahrtrichtungsänderung am genannten, um 90° gekrümmten Gleiselement (50) zu bewirken, wohl aber die Ausübung einer seitlichen manuellen Kraft auf die genannte Platte erfordert, um die Rotation und Fahrtrichtungsänderung am ersten der genannten, um 45° gekrümmten Gleiselemente (60) zu bewirken.

11. Zusammenbau gemäß der Definition in Anspruch 1, dadurch gekennzeichnet, daß das Gleis neben der genannten Gleiskreuzung (12, 16) wenigstens eine Umleitkreuzung enthält, wobei die genannte Laufkatze beim Einfahren in die genannte Umleitkreuzung aus einer beliebigen Richtung die genannte Umleitkreuzung nur in einer Richtung verlassen kann, ohne die Fahrtrichtung umzukehren.

12. Zusammenbau gemäß der Definition in Anspruch 11, dadurch gekennzeichnet, daß die genannte Umleitkreuzung ein Gleisumleitelement enthält, welches darauf starr angebracht ist, und daß die genannte Laufkatze (20) Laufkatzenumleitmittel enthält, die in das genannte Gleisumleitelement eingreifen, um die Richtungsbewegung der genannten Laufkatze (20) durch die genannte Umleitkreuzung zu kontrollieren.

13. Zusammenbau gemäß der Definition in Anspruch 12, dadurch gekennzeichnet, daß das genannte Gleisumleitelement ein gerades Element ist, wenn die genannte Laufkatze (20) so gesteuert wird, daß sie sich gerade durch die genannte Umleitkreuzung bewegt.

14. Zusammenbau gemäß der Definition in Anspruch 12, dadurch gekennzeichnet, daß das genannte Gleisumleitelement ein gekrümmtes Element ist, wenn die genannte Laufkatze (20) so gesteuert wird, daß sie ihre Fahrtrichtung an der genannten Umleitkreuzung ändert.

15. Zusammenbau gemäß der Definition in Anspruch 12, dadurch gekennzeichnet, daß das genannte Gleisumleitelement die Form einer sich in Längsrichtung erstreckenden geraden oder gekrümmten vertikalen Schiene (48) hat.

16. Zusammenbau gemäß der Definition in Anspruch 12, dadurch gekennzeichnet, daß das genannte Laufkatzenumleitmittel die Form eines Paars in Längsrichtung in Abständen angeordneter und in vertikaler Richtung sich erstreckender Stifte (46) oder Rollen hat.

17. Zusammenbau gemäß der Definition in Anspruch 12, dadurch gekennzeichnet, daß das genannte Laufkatzenumleitmittel entlang der Längsachse der genannten Laufkatze (20) oder seitlich in Abständen auf jeder Seite derselben angeordnet sein kann, um in entsprechend positionierte Gleisumleitelemente einzugreifen.

18. Zusammenbau gemäß der Definition in Anspruch 17, dadurch gekennzeichnet, daß das genannte Laufkatzenumleitmittel über oder unter dem genannten Laufkatzenkörper (22) angeordnet sein kann, um in entsprechend positionierte Gleisumleitelemente einzugreifen.

19. Zusammenbau gemäß der Definition in Anspruch 18, dadurch gekennzeichnet, daß sich das genannte Laufkatzenumleitmittel, wenn es unter dem genannten Laufkatzenkörper (22) angeordnet ist, nach oben oder unten erstrecken kann.

20. Zusammenbau gemäß der Definition in Anspruch 18, dadurch gekennzeichnet, daß das genannte Laufkatzenumleitmittel lang oder kurz sein kann und die genannten Gleisumleitelemente lang oder kurz sein können, so daß lange Laufkatzenumleitelemente in lange oder kurze Gleisumleitelemente eingreifen, während kurze Laufkatzenumleitmittel in lange, nicht jedoch in kurze Gleisumleitelemente eingreifen.

21. Zusammenbau gemäß der Definition in Anspruch 12, dadurch gekennzeichnet, daß das genannte Gleis- und Laufkatzensystem (10) eine Vielzahl von Platten (18) trägt, die jeweils durch das genannte Gleis durch zwei Laufkatzen (20) abgestützt werden, wobei das genannte System eine oder mehrere der

genannten Gleiskreuzungen (12, 16) und jeweils eine oder mehrere der genannten Umleitkreuzungen der Laufkatzen (20) im genannten System einschließlich der genannten Laufkatzenumleitmittel enthält, so daß jede Laufkatze (20) beim Einfahren in eine Gleiskreuzung (12, 16) selektiv veranlaßt werden kann, diese Gleiskreuzung in einer von wenigstens zwei Richtungen zu verlassen, ohne anzuhalten, und beim Einfahren in eine Umleitkreuzung diese Umleitkreuzung in nur einer Richtung verlassen kann, ohne die Fahrtrichtung zu ändern, so daß ein Gleis- und Laufkatzensystem zustandekommt, welches über eine Kombination von Ein- oder Mehrrichtungsgleiskreuzungen verfügt, die eine Richtungswahl ermöglichen, während eine oder mehrere Umleitkreuzungen eine vorprogrammierte Richtungssteuerung erlauben.

22. Zusammenbau gemäß der Definition in Anspruch 1, dadurch gekennzeichnet, daß das genannte Gleis- und Laufkatzensystem (10) eine Vielzahl von Platten (18) trägt, die jeweils von dem genannten Gleis durch zwei Laufkatzen (20) abgestützt werden, wobei die genannte Gleiskreuzung die Form einer Doppelzweck-Gleis/Umleitkreuzung hat, auf der ein Gleisumleitelement starr angebracht ist, während einige der Laufkatzen in dem genannten System Laufkatzenumleitmittel enthalten, die zur vorprogrammierten Richtungssteuerung dieser Laufkatzen durch die genannte Kreuzung in das genannte Gleisumleitelement eingreifen, während andere Laufkatzen in dem genannten System entweder keine Laufkatzenumleitmittel enthalten oder aber Laufkatzenumleitmittel enthalten, die aufgrund ihrer Konfiguration nicht in das genannte Laufkatzenumleitelement eingreifen, so daß solche Laufkatzen nach Wahl in mehreren Richtungen durch die genannte Kreuzung gelenkt werden können.

Revendications

1. Système à rail et à chariot (10) pour supporter de manière mobile des panneaux de paroi (13), ledit rail (30) comportant des flasques de rail espacées (28) définissant une fente de rail (32), ledit chariot (20) comportant quatre roues radiales (24) montées en paires tandem espacées latéralement sur un corps de chariot rigide (22) pour la rotation autour d'axes horizontaux parallèles, lesdites roues (24) s'engageant en roulant dans lesdites flasques de rail (28), un élément de support (34) s'étendant à travers ladite fente de rail (32) et reliant ledit chariot (20) à un panneau (13), ledit rail (30) comportant au moins une intersection de rail (12, 16), et ledit chariot (20) comporte une paire de roulettes de guidage (36) espacées longitudinalement et tournant autour d'un axe vertical, ledit élément de support (34) étant disposé entre lesdites roulettes de guidage (36),
caractérisé en ce que
ladite intersection de rail (12, 16) comporte au moins deux parties droites s'entrecoupant (42, 44), reliées par une partie de rail de raccordement, ladite partie de rail de raccordement comportant au moins un bord de flanc de rail courbé (40), la distance entre lesdites roulettes de guidage (36) et le diamètre extérieur de celles-ci et le rayon dudit bord de flanc de rail courbé (40) étant dimensionnés pour maintenir ledit élément de support (34) en rapport espacé avec ledit bord de flasque de rail courbé (40) permettant ainsi à la roulette de guidage avant de suivre ledit bord de flasque de rail courbé (40) en conséquence de la force latérale exercée sur ledit chariot (20) pendant le mouvement d'entrée dans ladite partie de raccordement de rail, le mouvement restant dudit chariot à travers ladite intersection étant automatiquement guidé par les roulettes de guidage (36) qui suivent la fente du rail (32) dans ladite partie de raccordement de rail.

2. Structure selon la revendication 1, caractérisée en ce que la rotation dudit chariot consiste en une rotation initiale partielle manuelle causée par l'application d'une force manuelle sur ledit panneau, suivie par une rotation automatique causée par la coopération entre ledit-chariot (20) et ladite partie de raccordement de rail.

3. Structure selon les revendications 1 ou 2, caractérisée en ce que la rotation partielle manuelle est de l'ordre de 30°.

4. Structure selon la revendication 3, caractérisée en ce qu'à ladite intersection de rail, ledit chariot (20) tourne et change de direction de marche de 90° au total dont ladite rotation automatique est de l'ordre de 60°.

5. Structure selon l'une quelconque des revendications 1 à 4, caractérisée en ce que le rayon dudit bord de flasque de rail courbé (40) est approximativement de la formule suivante :

$$r \geq \frac{(D_1 - D_2)^2 - l^2}{4(D_1 - D_2)}$$

dans laquelle r est le rayon dudit bord de flasque de rail courbé (40), D_1 est le diamètre de chacune des roulettes de guidage (36), D_2 est le diamètre dudit élément de support (34) et l est la distance entre les axes desdites roulettes de guidage.

6. Structure selon la revendication 1, caractérisée en ce que ledit chariot (20) à son entrée dans l'intersection (16) à partir d'au moins une direction peut sortir de ladite intersection dans l'une quelconque de trois directions sans s'arrêter lorsqu'il change de direction de marche.

7. Structure selon la revendication 1, caractérisée en ce que ladite intersection de rail (16) est une intersection en X consistant en un rail traversant droit (52, 64) et des ramifications de rail droite (56) et gauche (54) qui sont alignées l'une sur l'autre et perpendiculairement par rapport audit rail traversant (52, 64), chaque ramification de rail étant raccordée audit rail traversant par une partie de rail de raccordement de manière à ce que les parties de rail de raccordement respectives coupent ledit rail traversant sur des côtés opposés et en des points longitudinalement espacés le long dudit rail traversant (52, 64), empêchant de la sorte un alignement transversal des ouvertures dans les flasques de rail dudit rail traversant (52, 64) et empêchant le mouvement vertical dudit chariot (20) lorsqu'il traverse ladite intersection dans une direction droite traversante ou dans l'une quelconque des directions de ramification avec trois des quatre roues (24) dudit chariot (20) étant toujours en engagement de support avec lesdites flasques de rail (28).

8. Structure selon la revendication 7, caractérisée en ce qu'une des parties de rail de raccordement comporte un élément de rail courbé à 90° (50) et l'autre desdites parties de rail de raccordement comporte une paire d'éléments de rail courbés à 45°, espacés (60, 62) pour faciliter l'alignement desdits rails de ramification (54, 56) l'un sur l'autre et l'espacement longitudinal desdits points d'intersection desdites parties de rail de raccordement respectives sur ledit rail traversant (52, 64).

9. Structure selon la revendication 1, caractérisée en ce que ladite intersection de rail est une intersection en Y consistant en un rail d'approche droit (52) et des rails de ramification droit (56) et gauche (54) qui sont alignés l'un sur l'autre et perpendiculairement par rapport audit rail d'approche (52), chaque ramification de rail étant raccordée audit rail d'approche par une partie de rail de raccordement de manière à ce que les parties respectives de rail de raccordement se joignent au rail d'approche (52) en des points longitudinalement espacés le long du rail d'approche, l'une des parties de rail de raccordement comportant un élément de rail courbé à 90° (5) et l'autre desdites parties de rail de raccordement comportant une paire d'éléments de rail espacés à 45° (60, 62) pour faciliter l'alignement desdits rails de ramification (54, 56) l'un sur l'autre.

10. Structure selon la revendication 9, caractérisée en ce que ledit chariot (20) n'exige pas l'application d'une force manuelle latérale sur le panneau pour tourner et changer sa direction de marche audit élément de rail courbé à 90° (50) mais requiert l'application d'une force manuelle latérale audit panneau pour tourner et changer de direction de marche au premier desdits éléments de rail courbés à 45° (60).

11. Structure selon la revendication 1, caractérisée en ce qu'en plus de ladite intersection de rail (12, 16), le rail comporte au moins une intersection de déviation dans laquelle ledit chariot, en entrant dans ladite intersection de déviation à partir d'une direction quelconque peut sortir de ladite intersection de déviation dans une seule direction sans inverser sa direction de marche.

12. Structure selon la revendication 11, caractérisée en ce que ladite intersection de déviation comporte un élément de déviation de rail monté de manière rigide sur ce dernier et ledit chariot (20) comporte des

moyens de déviation du chariot s'engageant dans ledit élément de déviation de rail pour maîtriser le mouvement directionnel dudit chariot (20) à travers ladite intersection de déviation.

13. Structure selon la revendication 12, caractérisée en ce que ledit élément de déviation de rail est un élément en ligne droite lorsque ledit chariot (20) est commandé pour se déplacer en ligne droite à travers ladite intersection de déviation.

14. Structure selon la revendication 12, caractérisée en ce que ledit élément de déviation de rail est un élément en ligne courbe lorsque ledit chariot (20) est commandé pour changer sa direction de marche à ladite intersection de déviation.

15. Structure selon la revendication 12, caractérisée en ce que ledit élément de déviation de rail est en forme d'une lame (48) verticale droite ou courbe s'étendant longitudinalement.

16. Structure selon la revendication 12, caractérisée en ce que ledit moyen de déviation du chariot est en forme d'une paire de pointes (46) ou de roulettes s'étendant verticalement et étant espacées longitudinalement.

17. Structure selon la revendication 12, caractérisée en ce que ledit moyen de déviation du chariot peut être logé le long ou latéralement espacé sur l'un ou l'autre côté de la ligne centrale longitudinale dudit chariot (20) pour s'engager dans des éléments de déviation du rail positionnés en correspondance.

18. Structure selon la revendication 17, caractérisée en ce que ledit moyen de déviation du chariot peut être logé au-dessus ou au-dessous dudit corps de chariot (22) pour s'engager dans des éléments de déviation de rail positionnés en correspondance.

19. Structure selon la revendication 18, caractérisée en ce que ledit moyen de déviation du chariot, lorsqu'il est logé au-dessous dudit corps de chariot (22), peut s'étendre vers le haut ou vers le bas.

20. Structure selon la revendication 18, caractérisée en ce que ledit moyen de déviation du chariot peut être long ou court et lesdits éléments de déviation du rail peuvent être longs ou courts de sorte que le moyen de déviation de chariot long s'engagera dans les éléments de déviation de rail longs ou courts alors que des moyens de déviation de chariot petits s'engageront dans des éléments de déviation de rail longs mais pas dans des courts.

21. Structure selon la revendication 12, caractérisée en ce que ledit système à rail et à chariot (10) supporte une pluralité de panneaux (18), chaque panneau étant supporté par ledit rail et deux chariots (20), ledit système comportant une ou plusieurs desdites intersections de rail (12, 16) et une ou plusieurs desdites intersections de déviation, chacun des chariots (20) dans ledit système comportant ledit moyen de déviation de chariot de manière à ce que chaque chariot (20), à entrant une intersection de rail (12, 16), peut être sélectivement amené à sortir d'une telle intersection de rail dans l'une quelconque d'au moins deux directions sans s'arrêter et, en entrant une intersection de déviation, il peut sortir d'une telle intersection de déviation dans une seule direction sans inverser sa direction de marche, réalisant ainsi un système de rail et de chariot présentant une combinaison d'intersections de rail à une ou plusieurs directions, présentant une sélection directionnelle avec une ou plusieurs intersections de déviation, présentant une commande de direction préprogrammée.

22. Structure selon la revendication 1, caractérisée en ce que ledit système à rail et à chariot (10) supporte une pluralité de panneaux (18), chaque panneau étant supporté dans ledit rail par deux chariots (20), ladite intersection de rail étant en forme d'intersection de rail/déviation bivalente, comportant un élément de déviation de rail monté rigidement sur celui-ci, certains desdits chariots dans ledit système comportant un moyen de déviation du chariot qui s'engage dans ledit élément de déviation de rail pour la commande directionnelle préprogrammée de ces chariots à travers ladite intersection alors que d'autres chariots dans ledit système ne comportent pas de moyen de déviation de chariot ou comportent un moyen de déviation de chariot configuré pour ne pas s'engager dans ledit élément de déviation de rail de sorte que de tels chariots peuvent être sélectivement dirigés dans des multiples directions à travers ladite intersection.

FIG. 1

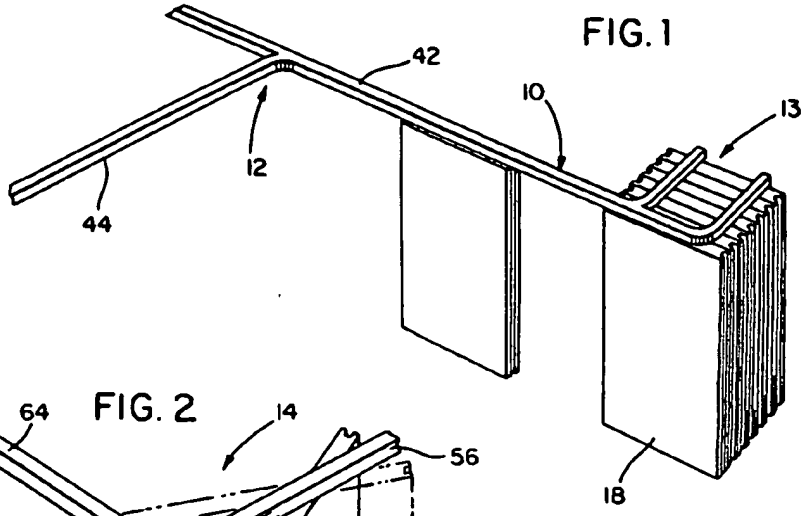

FIG. 2

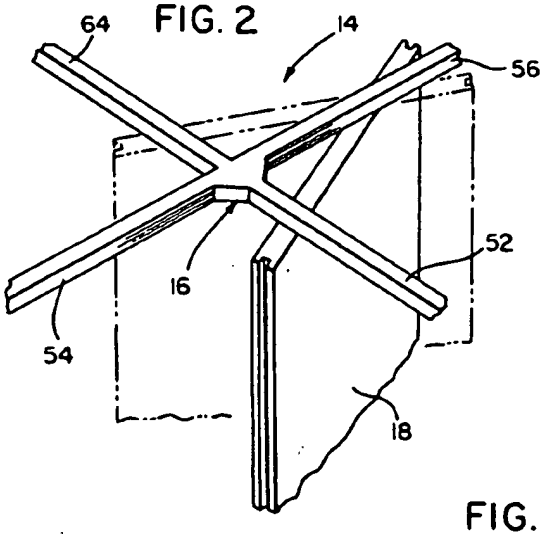

FIG. 3

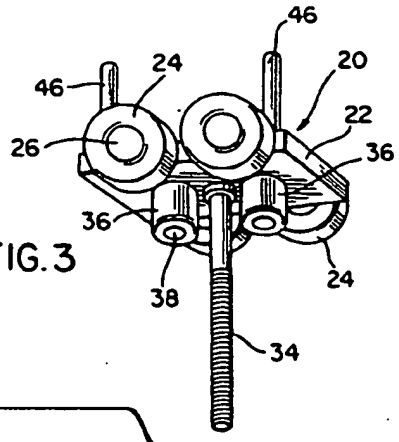

FIG. 4

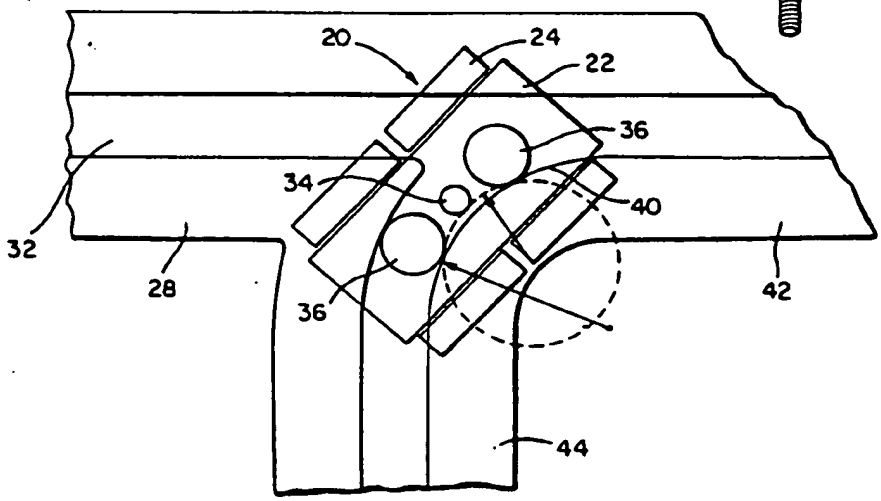

FIG. 5A

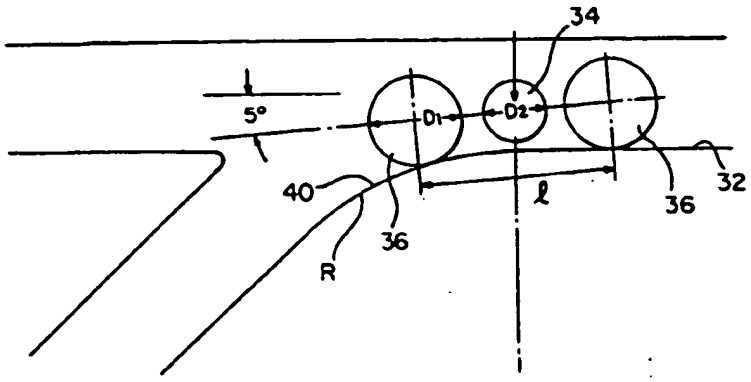

FIG. 5B

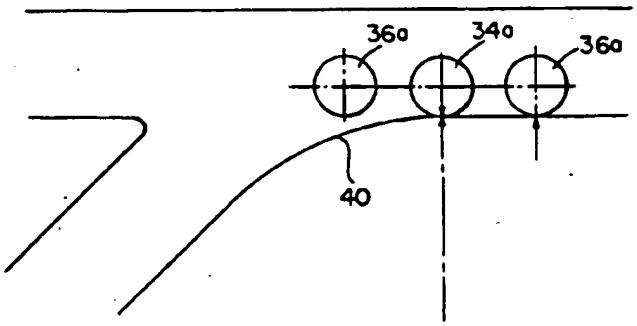

FIG. 6

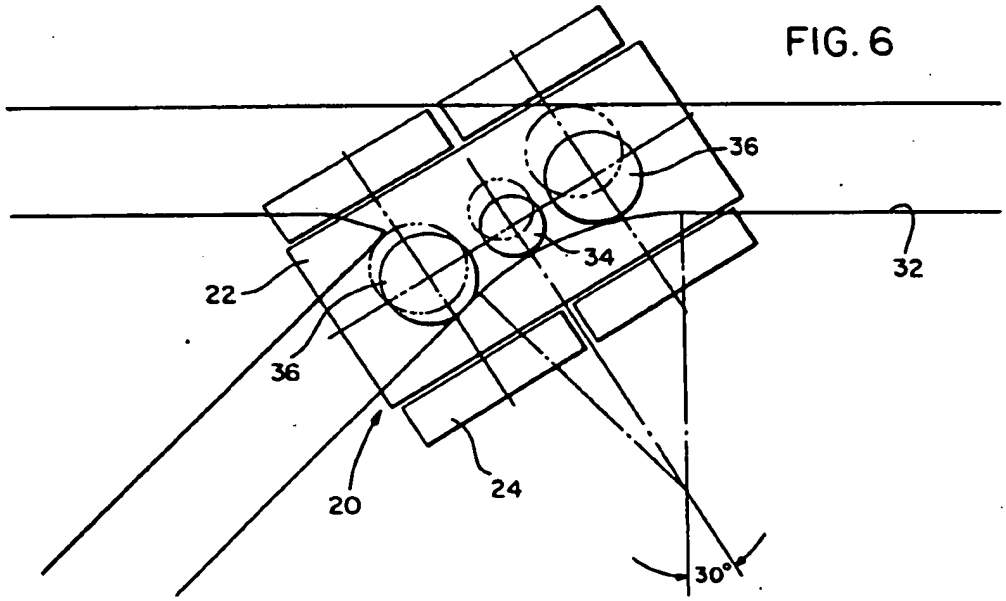

FIG. 7

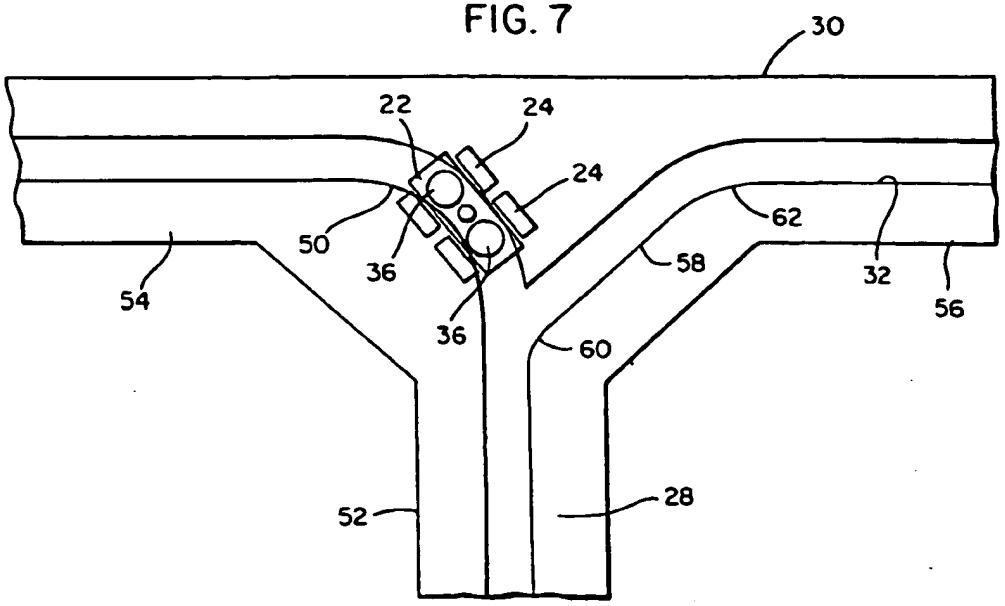
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FIG. 8

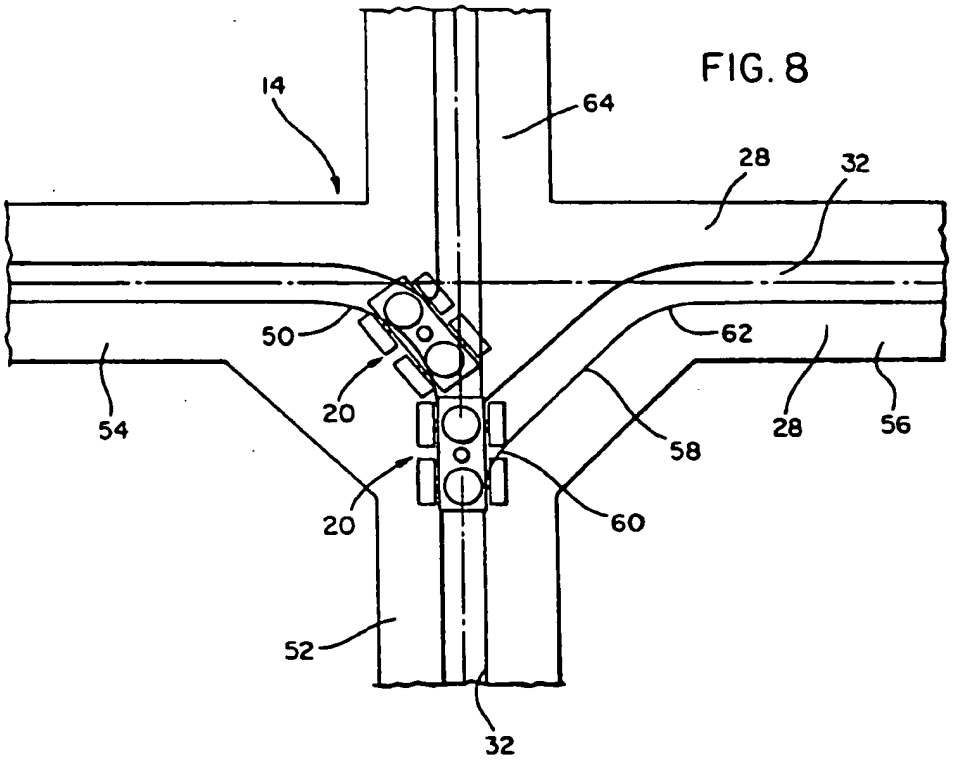
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FIG. 9

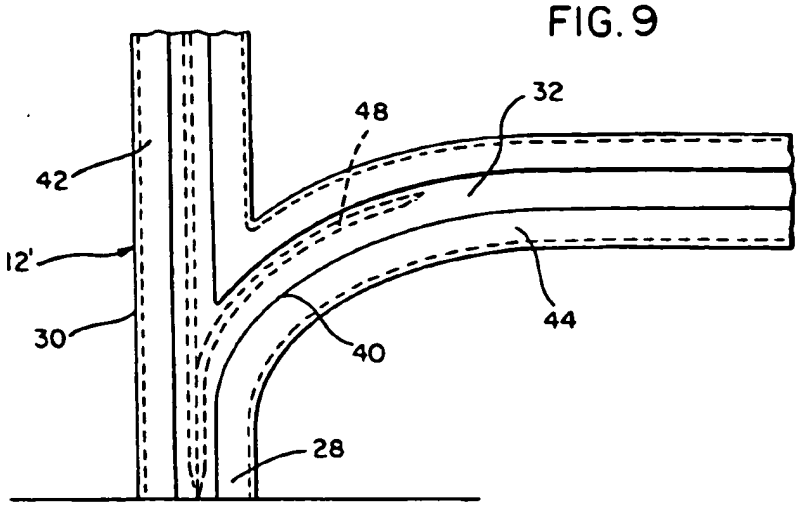

FIG. 10

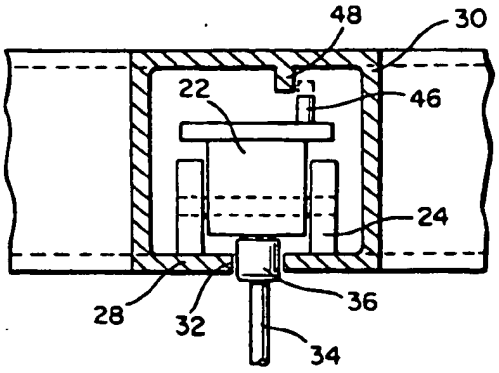

FIG. 11